

## REMARKS ON THE INSECTIVORES OF THE GENUS GYMNURA.

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An examination of nearly two dozen specimens of the genus *Gymnura* in the United States National Museum shows that in addition to the two distinct species usually recognized, a third form, from the northern portion of the Malay Peninsula, must be considered. It is here described for the first time as a subspecies of the older of the two species.

As there is some lack of agreement among authors regarding the limits of the genus *Gymnura*, it will not be out of place to consider some of its characteristics before describing the new subspecies. Dobson,<sup>a</sup> Flower and Lyddeker,<sup>b</sup> and Trouessart<sup>c</sup> have included under the term *Gymnura* certain small short-tailed species, which other writers, Thomas<sup>d</sup> and Max Weber,<sup>e</sup> for instance, regard as constituting a separate genus *Hylomys*. I quite agree with the opinion of these latter, and in order to show the distinctness of *Gymnura* from *Hylomys* figures of their skins and skulls are shown on Plates 34 to 37. In order to make the relations of the genus *Gymnura* still clearer, the entire animal and the extracted skull of the unique specimen of the recently discovered and related genus *Podogymnura*,<sup>f</sup> an animal unknown to the authors cited, are shown on the plates 36 and 37.

*Gymnura* is here considered as one of three genera forming the subfamily Gymnurinae, the other two being *Hylomys* and *Podogymnura*. In respect to size and external characteristics *Hylomys* and *Podogymnura* appear to be closely related to one another. (Plate 37.) An examination of the teeth, however (Plate 36), shows that these

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<sup>a</sup> Monogr. Insectivora, 1882, p. 5.

<sup>b</sup> Introd. Study of Mammals living and extinct, 1891, p. 620.

<sup>c</sup> Cat. Mamm. Suppl., 1904, p. 126.

<sup>d</sup> Ann. Mag. Nat. Hist., 6th ser., II, November, 1888, p. 407.

<sup>e</sup> Die Säugetiere, 1904, p. 379.

<sup>f</sup> Mearns, Proc. U. S. Nat. Mus., XXVIII, No. 1402, p. 437, May 13, 1905.

two genera are very distinct. The premolars both above and below in *Hylomys* are  $\frac{4}{4}$ , in *Podogymnura*  $\frac{3}{3}$ . The three anterior premolars in *Hylomys* are small, practically functionless teeth, while in *Podogymnura* the penultimate premolar is well developed and trenchant, standing nearly as high in the tooth row as the last premolar (Plate 36). The premolars in *Gymnura* are  $\frac{4}{4}$ , as they are in *Hylomys*. The two anterior of them are small and practically functionless, like the three anterior premolars of *Hylomys*; the two posterior are large and trenchant, like the two posterior premolars of *Podogymnura*. (Compare Plates 35 and 36.) Of the three genera *Gymnura* appears to be the most generalized and primitive, and from it or its ancestors the other two genera have been derived. In the shortening of the tail and simplification in the structure of the premolars *Hylomys* has departed further from *Gymnura* than has *Podogymnura*. The last upper molar of *Podogymnura* and *Hylomys* shows a more simple structure than the corresponding tooth of *Gymnura*, which has a distinct posterior heel, lacking in the other two genera. The genus *Gymnura* is said to present the most generalized structure known among placental mammals.<sup>a</sup> An account of its anatomy is given in Dobson's Monograph of the Insectivora, 1882.

The geographic distribution of the genus coincides with part of the Malayan subregion of the Oriental region, namely, Tenasserim, the Malay Peninsula, Sumatra, and Borneo, and a few immediately adjacent islands. So far as known, it does not occur on others of the larger or of more remote smaller islands of the Malayan Archipelago.

Although the existence of two species in the genus had been pointed out by Giebel in 1863,<sup>b</sup> yet they were usually considered as mere local varieties, or color phases, until Jentink reaffirmed their specific distinction in 1881.<sup>c</sup> Jentink and other writers have described certain peculiarities of shape in the skull and teeth by which the two species in the genus may be distinguished, but I have been unable to detect any other peculiarities than size and color for distinguishing them. The skulls and teeth, however, show many individual variations, but none of them are constant for definite geographic areas. The characters assigned by other writers may probably be explained as the result of examining too small a number of specimens.

The different members of the genus may be distinguished by the following key:

KEY TO THE SPECIES AND SUBSPECIES OF *GYMNURA*.

- a. Color uniformly white or whitish, size large, hindfoot 66-74 mm., basal length of skull 76-84-----*Gymnura alba*, p. 453

<sup>a</sup> Huxley, Proc. Zool. Soc. London, 1880, p. 657.

<sup>b</sup> Zeitschr. Ges. Naturw., XXII, p. 277.

<sup>c</sup> Notes Leyden Mus., III, pp. 166-168.

- b.* Color black with some white on head and shoulders, size medium or small, hindfoot 58-68 mm., basal length of skull 67-78.—*Gymnura gymnura*, p. 451
- a.*<sup>1</sup> Size medium; hindfoot, 61-68 mm.; basal length of skull 71-78.  
*G. g. gymnura*, p. 451
- b.*<sup>2</sup> Size small; hindfoot 58-59 mm.; basal length of skull 67-71.  
*G. g. minor*, p. 453

## GYMNURA GYMNURA (Raffles).

*Diagnostic characters.*—Size small or medium; hindfoot 58-68 mm.; basal length of skull 61-78; color generally black, with white markings on head. See fig. 3, Plate 34.

*Color.*—General color black or blackish, except lips, chin, cheeks, an irregular V-shaped patch on top of head, and terminal fourth or more of tail white or whitish. About the shoulders and on upper back are numerous long hairs with long white or whitish tips. Similar hairs, but much shorter, occur on the throat.

*Pelage.*—The pelage is composed of two kinds of hairs, short (10-15 mm.) soft underfur of a dull blackish, brownish or dark drab-gray color, except about lips and cheeks, where it is white or whitish; and long, coarse, bristly hair, 50-60 mm. in length uniformly black in color, except in the region of the light markings about head and shoulders, where the long hairs are white throughout their extent or else have long white tips. About the head the long hairs are much shorter than over the rest of the body. On the underparts the long hairs are relatively few, soft, and short.

*Tail.*—The tail is covered with small scales about 10 to the centimeter, each scale subtended by about 3 hairs. On the dorsal surface of the tail the hairs are inconspicuous and a little longer than a scale in length; on the underside they are more conspicuous and equal 3 or 4 scales in length.

*Distribution.*—Tenasserim, Malay Peninsula, Sumatra.

*Remarks.*—This species is separable into two distinct races, a smaller one from Tenasserim, and Trong, Lower Siam, described below as new, and the typical race found on the lower end of the Malay Peninsula and on Sumatra.

## GYMNURA GYMNURA GYMNURA (Raffles).

1822. *Viverra gymnura* RAFFLES, Trans. Linn. Soc. London, XIII, p. 272. (Type-locality, probably Bencoolen, Sumatra.)
1827. *Gymnura rafflesii* LESSON, Man. Mamm., p. 171. (May 1827. See Palmer, North Amer. Fauna, no. 23, 1904, p. 304.)
1827. *Gymnura rafflesii*, HORSFIELD and VIGORS, Zool. Journ., III, p. 248, pl. yIII. (October, 1827. See Palmer, North Amer. Fauna, no. 23, 1904, p. 304.)

*Diagnostic characters.*—A large race of *Gymnura gymnura*, hind foot, 61-68; basal length of skull, 71-78.

*Color.*—As described above under *G. gymnura*.

*Skull and teeth.*—These are relatively large and heavy, otherwise they do not differ from those of the race described below. See fig. 2, Plate 35.

*Distribution.*—The U. S. National Museum contains specimens from Rumpin River, Pahang, Malay Peninsula; Singapore; Tapanuli Bay, west coast of Sumatra; the Siak region of eastern Sumatra, and Pulo Tebing Tinggi, a low alluvial island off the east coast of Sumatra. This form is probably generally distributed throughout Sumatra and the lower extremity of the Malay Peninsula.

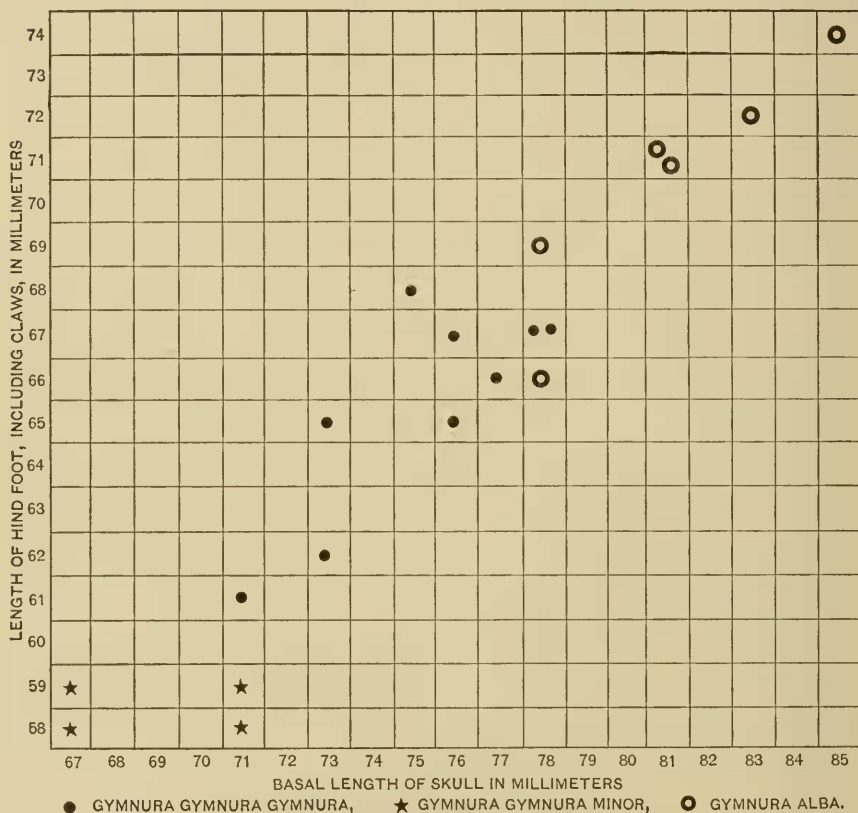


DIAGRAM TO SHOW THE RELATIVE SIZES OF THE THREE FORMS IN THE GENUS *GYMNURA* AS DETERMINED BY LENGTH OF HIND FOOT, INCLUDING CLAWS, AND OF BASAL LENGTH OF SKULL. MEASUREMENTS ARE IN MILLIMETERS. EACH DOT REPRESENTS AN ACTUAL SPECIMEN.

*Remarks.*—What is apparently an albino specimen of this race is recorded by Schneider<sup>a</sup> as *Gymnura alba*. He remarks, however, that it is distinctly smaller than white examples that he has seen from Borneo. Aside from color, difference in size is apparently the only manner by which Bornean and Sumatran examples may be distinguished. Schneider himself thought his example only a "sport."

<sup>a</sup> Zool. Jahrb. Syst., XXIII, 1905, p. 89.

*GYMNURA GYMNURA MINOR*, new subspecies.

*Type*.—Skin and skull of adult male, Cat. No. 86783, U.S.N.M., collected at Trong, Lower Siam (on Khow Nok Ram, 2,000 feet altitude), January 12, 1899, by Dr. W. L. Abbott.

*Diagnostic characters*.—Similar in all respects to the typical race, but averaging distinctly smaller throughout. See fig. 1, Plate 34.

*Color*.—The color of *Gymnura gymnura minor* does not differ essentially from that of *G. g. gymnura*, but there is a tendency to have more white about the head, neck, shoulders, and upper portion of back, as well as a narrower and less conspicuous black superciliary stripe.

*Skull and teeth*.—These possess the same relative shapes and proportions in *Gymnura gymnura minor* as they do in *G. g. gymnura*, but average distinctly smaller throughout. See fig. 1, Plate 35.

*Measurements*.—A series of four adults, all from Trong, give the following extremes of measurements: Head and body, 311–335 mm.; tail, 216–241; hind foot, with claws, 58–59; basal length of skull, 67–71; upper tooth row (all teeth, alveoli), 40–42. See table, page 455.

*Specimens examined*.—Four from the type-locality, 2 from an altitude of 2,000 feet, 1 from 1,000 feet. The altitude for the remaining specimen is not known.

*Distribution*.—Trong, Lower Siam, extending northward into Tenasserim. The small size of individuals from the latter country has been mentioned by both Dobson<sup>a</sup> and Blandford.<sup>b</sup> Bonhote<sup>c</sup> remarks that “the Malayan form appears to be smaller than the Sumatran race.”

*GYMNURA ALBA* Giebel.

1863. *Gymnura alba* GIEBEL, Zeitschr. Ges. Naturw., XXII, 1863, p. 277. Type-locality, Borneo.)

1876. *Gymnura rafflesii* var. *caudata* GÜNTHER, Proc. Zool. Soc. London, 1876, p. 425. (Type-locality, “Labuan, the mainland opposite Labuan, and Sarawak,” Borneo.)

*Diagnostic characters*.—Color entirely white or essentially so, largest member of the genus, hind foot 66–73 mm., basal length of skull, 78–85.

*Color*.—Everywhere white or dirty white or cream color, with the exception of a few long hairs on the back which have long black tips. See fig. 2, Plate 34.

*Pelage and tail*.—Except for color these have the same characters in *Gymnura alba* that they do in *G. gymnura*.

<sup>a</sup> Monogr. Insectivora, p. 4.

<sup>b</sup> Fauna British India, Mammals, p. 221.

<sup>c</sup> Journ. Fed. Malay States Mus., III, p. 3, 1908.

*Skull and teeth.*—These possess the same relative shapes and proportion as they do in *Gymnura gymnura*, but are distinctly larger throughout. See fig. 3, Plate 35.

*Measurements.*—See table, page 455, and diagram, page 452.

*Distribution.*—Borneo and the off-lying island of Labuan. Specimens in the U. S. National Museum are from along the Sempang River, southwestern Borneo.

*Remarks.*—I have been unable to find any constant character, aside from size and color, to distinguish between *Gymnura gymnura* and *G. alba*.

As in point of size the two species of *Gymnura* overlap one another slightly, it would be impossible to identify positively a large albino specimen of *G. gymnura* or a small individual of *G. alba*. A black individual is mentioned by Dobson <sup>a</sup> as possibly coming from Borneo. The size relationships of the three forms on the basis of hind foot and basal length of skull are shown by the diagram, page 452.

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<sup>a</sup> Monogr. Insectivora, p. 4.



External and cranial measurements of *Gymnura gymnura* and *G. alba*.

Name	Locality.	Cat. No.	Sex.	Teeth.	Basioecipito-sphenoid suture.	Head and body. <sup>a</sup>	Tail. <sup>a</sup>	Hind foot with claws. <sup>b</sup>	Basal length of skull.	Palatal length.	Zygomatic width.	Upper tooth row; all teeth (alveoli).	Mandible, front of symphysis to back of condyle.	Mandibular tooth row; all teeth (alveoli).
<i>G. gymnura gymnura</i> ...	Pahang: R u m p i n River.	115489	Male.	Slightly worn.	Practically obliterated...	410	270	67	78.5	51	39.5	46.5	66.4	41.2
Do.	Singapore.	3767		Much worn.	Distinct, but closed...	377	255	61	71	46	38	42.5	60	37.3
Do.	Sumatra: T a p a n u l i Bay.	114551	Male.	Distinctly worn.	...							43	57.9	37.3
Do.	Sumatra: Little Siak River.	144172	do.	do.	Obliterated.	372	253	66	77	50	38.5	46	63	39.9
Do.	do.	144173	do.	Very slightly worn.	Practically obliterated...	365	250	62	73	48	38	42.2	60	36.4
Do.	do.	144171	Female.	Distinctly worn.	do.	402	263	67	78	51	41	45.7	62.3	40
Do.	do.	144174	do.	Much worn.	do.	371	250	65	76	48	40	44	60.2	38.4
Do.	Sumatra: M a n d a u River.			Distinctly worn.	Nearly obliterated...	382	280	67	76.5	49	38.5	45	62.3	38.8
Do.	Sumatra: Pulo Tebing Tingi.	144329	do.											
Do.	do.	144330	do.	Unworn.	Distinct and open...	370	260	68	75	49	36.5	45	60	39.3
Do.	do.	144331	do.	Traces of wear.	do.	390	240	65	73.5	47.2	37.5	44.5	61	38.4
<i>G. gymnura minor</i> ...	Lower Siam: Trong.	83499	Male.	do.	Distinct, but closed...	330	241	59	71	43.5	30	41.5	56.1	36.5
Do.	do.	86783	do.	Slightly worn.	Distinct and open...	324	235	59	67	43	36.2	40.5	55.2	35.2
Do.	do.	86785	Female.	Distinctly worn.	Nearly obliterated...	335	216	58	71	45.5	30	42	56.4	36.7
Do.	do.	86784	do.	Unworn.	Distinct and open...	311	232	58	67	42.5	35	40	52	35
Do.	do.	145583	Male.	Practically unworn.	do.	389	263	71	81	51.6	42	47.6	66.8	41.7
<i>G. alba</i> ...	S. W. Borneo: Sem-pang River.													
Do.	do.	145584	do.	Distinctly worn.	Practically obliterated...	445	250	72	84.5	53.3	45	48.6	66.8	41.5
Do.	do.	145581	Female.	Traces of wear.	Distinct, but closed...	392	190	66	76.6	49.3	41.5	43.8	61.4	39.3
Do.	do.	145582	do.	Distinctly worn.	Practically obliterated...	420	262	74	85.5	55.2	45	49.8	67.7	43
Do.	do.	145585	do.	Slightly worn.	Distinct, but closed...	410	278	69	78.2	50	42	46	64.5	40
Do.	do.	145586	do.	do.	do.	405	205	71	81.4	52.3	42.3	47.8	64.8	41.3

<sup>a</sup> Measured by writer from dried skins.<sup>b</sup> Collector's measurements.<sup>c</sup> Type.

## EXPLANATION OF PLATES.

PLATE 34 (about  $\frac{1}{2}$  natural size).

- FIG. 1. Skin of *Gymnura gymnura minor*, adult female, Cat. No. 86784, U.S.N.M., Trong, Lower Siam, 2,000 feet altitude, collected by Dr. W. L. Abbott.
2. Skin of *Gymnura alba*, adult female, Cat. No. 145585, U.S.N.M., Sempang River, western Borneo, collected by Dr. W. L. Abbott.
3. Skin of *Gymnura gymnura gymnura*, adult male, Cat. No. 144173, U.S.N.M., Little Siak River, east coast of Sumatra, collected by Dr. W. L. Abbott.

PLATE 35 ( $\frac{2}{3}$  natural size, dorsal, lateral, and ventral views of skulls).

- FIG. 1. *Gymnura gymnura minor*, Cat. No. 86783, U.S.N.M. Type, Trong, Lower Siam.
2. *Gymnura gymnura gymnura*, Cat. No. 144171, U.S.N.M., Little Siak River, Sumatra.
3. *Gymnura alba*, Cat. No. 145584, U.S.N.M., Sempang River, western Borneo.

## PLATE 36 (twice natural size).

Skulls of *Hylomys suillus* (Müller and Schlegel), Cat. No. 124229, U.S.N.M., Tenasserim, Dr. W. L. Abbott, collector, and *Podogymnura truci* Mearns, Type, Cat. No. 125286, U.S.N.M., Mount Apo, Mindanao, Philippine Islands, Dr. E. A. Mearns, U. S. A., collector.

- FIG. 1. Right mandibular ramus of *Hylomys*.
2. Right mandibular ramus of *Podogymnura*.
3. Dorsal view of mandibular teeth of *Hylomys*.
4. Dorsal view of mandibular teeth of *Podogymnura*.
5. Palatal view of part of skull of *Hylomys*.
6. Palatal view of part of skull of *Podogymnura*.
7. Lateral view of facial portion of skull of *Podogymnura*.
8. Lateral view of facial portion of skull of *Hylomys*.

PLATE 37 (about  $\frac{5}{7}$  natural size).

- FIG. 1. External appearance of *Podogymnura truci* Mearns. Type, Cat. No. 125286, U.S.N.M., Mount Apo, Mindanao, Philippine Islands.
2. External appearance of *Hylomys suillus dorsalis* Thomas. Topotype, Cat. No. 124328, U.S.N.M., Mount Kinabalu, British North Borneo.